

REMARKS

Status of Application

Claims 1, 9, 12, 27, 31, 32, 34-40, and 45-53 are pending. Claims 36 and 37 are allowed and claims 35 and 40 are objected to. The Office has indicated that the objected claims contain allowable subject matter. Claims 1, 9, 12, 27, 31, 32, 34, 38, 39, 45, and 48-53 were rejected in the January 19th Action as claiming subject matter that is allegedly obvious.

Claim Rejections – 35 U.S.C. § 103

A. Summary

Claims 1, 9, 12, 27, 31, 34, 39, 48, and 50-51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 1108553A1, issued to Principe, in view of an article entitled “New Cold-Curing High Performance UV System” authored by Jackson, and U.S. Patent No. 6,616,355, issued to Cleary.

As will be explained in greater detail below, the Section 103 rejection of the claims should be rescinded at least because:

- Principe teaches away from using cold UV;
- there is no reason to use cold UV in the Principe printer because the printer discloses a system that uses lamps that reach a temperature of 700 °C, wherein that high temperature is desirable; and
- there is no reason to substitute a vacuum plate for the substrate holding mechanism used in the Principe printer.

B. Detailed Analysis

The Office asserts that Principe discloses a substrate supporting plane; an ink jet print head on a carriage; moving a print head carriage; jetting ink from the print head onto a substrate; and at least one UV lamp on the carriage sufficiently close to the ink jet print head, where the UV lamp is configured to emit sufficient UV energy to cure the ink. The Office also asserts that Principe discloses two UV lamps – one leading and one trailing and a controller to activate the UV lamps. The Office admits that Principe fails to teach cold UV. However, the Office asserts that Jackson teaches cold UV and that it would have been obvious to combine Jackson and Principe to improve product quality. Finally, the Office indicates that Cleary teaches a vacuum

source and that it would have been obvious to apply a vacuum as taught by Cleary to prevent the substrate from falling off the platen/support member and to help maintain a distance between the substrate and a print head.

The U.S. counterpart to the Principe reference is U.S. Patent No. 6,575,093. The '093 patent was discussed with the Office during an in-person interview held on 21 June 2006. The '093 patent was also discussed in an Interview Summary mailed by the Applicant to the Office on 20 July 2006. For the reasons noted during the in-person interview and the interview summary, the Principe reference (whether in the form of the European patent or the U.S. patent) is inapplicable to the claimed subject matter. The Principe reference discloses a system that uses lamps that reach a temperature of 700 °C and blows hot air onto the substrate.

Principe discloses UV lamps 20 and 21 that flank the printing heads 12. Col. 2, lines 23-25. One objective of the invention disclosed in Principe is to allow for the creation of "the appropriate spraying conditions to influence the ink sprayed on the flat support 11, so as to warrant a rapid drying-out of the same." Col. 2, lines 57-58 to col. 3, lines 1-2. "[T]he radiation of the UV lamps allows a fast drying of the ink, which results in a high printing quality." Col. 3, lines 32-34. Principe explains how the UV lamps help achieve these objectives:

The use of the lamps UV 20 and 21 **allows reaching a very high temperature**, which may attain and exceed 700 °C, while the presence of the flexible tubes 24 and 25 allows drawing cold air from the fans 26 and 27, so as to avoid any overheating of the components of the machine 10.

Col. 3, lines 7-12 (emphasis added). Principe teaches a system where one of its objectives is to use lamps that allow for reaching "very high temperature[s]," which may exceed 700 °C. In addition, the air drawn from the fans is used to prevent **the machine** from overheating and is not meant to provide a cold UV system. Cold air appears to be drawn from above the print head by fans. The fans blow the air into tubes that are connected to boxes which hold UV lamps. The lamps appear to be ordinary UV lamps, not cold UV lamps. As noted, the lamps are said to reach temperatures "which may attain and exceed 700 °C." The boxes housing the lamps appear to have one opening on their bottom. Thus, air passing by the lamps appears to exit this opening and flow onto the substrate. Thus, Principe discloses a device where air heated by the lamps is

blown onto the substrate, **which is counter to and teaches away from** the concept of reducing the amount of heat impinged on the substrate.

Principe does not teach using a cold UV light source to substantially cure the jetted ink while limiting or reducing the UV generated heat enough in order to prevent temporary substrate deformation that would adversely affect print quality or change the printhead-to-substrate distance. Since Principe discloses that one of its desirable objectives is to use UV lamps that generate large amounts of heat, Principe does not teach, for example, “providing at least one cold UV lamp on the carriage oriented to direct UV energy onto the surface of the substrate sufficiently close to where ink is being jetted onto the surface so as to substantially cure dots of the jetted ink on the surface; and the cold UV lamp being effective to impinge sufficient UV energy on the jetted ink to substantially cure the jetted ink without impinging sufficient radiation of other wavelengths that would heat the substrate so as to deform it.”

The Office asserts that it would have been obvious to modify the Principe printer to use cold UV as disclosed in Jackson to “improve product quality.” Principe states that its method of using UV lamps allows for reaching of very high temperatures, “allow[ing] a fast drying of the ink, which **results in high printing quality.**” Col. 3, lines 7-8 and 32-34 (emphasis added). Principe discloses that its method of using high temperatures improves product quality. Thus, there would be no legitimate motivation to combine the references, as high print quality is already achieved.

In addition, the Office has asserted improvement of product quality as a basis for its obviousness rejections in the past and the Applicant has noted that such a sweeping and general motivation such as “improving quality” could be applied to almost any situation as almost no rational person enjoys things that are of “poorer quality.” Thus, the Office provides no legitimate motivation for combining the references.

More importantly, the appropriate inquiry with respect to obviousness is why would someone of ordinary skill in the art modify the Principe printer to use cold UV? As noted in previous responses, Jackson, in summary, establishes that cold UV was known. However, as noted above, Principe uses UV lamps which produce large amounts of heat, which according to Principe is the desired effect. UV light from the lamp is impinged on the substrate in which thermal deformation appears to be of no concern. In fact, there is nothing in Principe that indicates that substrate deformation is a problem that needs to be corrected. Thus, combining

cold UV with the Principe reference is not necessary (the Principe printer appears to operate suitably for its intended use and it achieves its objective of generating large amounts of heat). Further, based on Principe such a combination does not provide any benefits such as improving quality, as there does not appear to be any deformation problems that exist in the Principe printer. Therefore, there is no reason to combine the teachings of the references or modify the Principe reference.

The Office also asserts that it would have been obvious to apply a vacuum as taught by Cleary to the substrate to help maintain the distance between the substrate and the print head and prevent the substrate from falling off the platen/support member. However, there is no need to use a vacuum in the Principe printer. Principe already has a mechanism to maintain paper sheets in an appropriate location. The Principe printer prints on paper that is positioned on a flat support. Cleary discloses a transport belt 18 which moves a substrate through the system. Col. 3, lines 11-12. Cleary uses a vacuum to prevent the substrate from slipping on the transport belt. Col. 3, lines 50-51. Principe does not indicate the use of any type of moving transport system, and thus, already has a suitable mechanism for holding the paper or substrate in position. There is nothing in Cleary or Principe that would suggest that adding vacuum to a flat support or replacing the flat support/guide assembly of Principe with a vacuum/moving belt assembly would keep the paper in position better than the components already used to accomplish this purpose or improve any other aspect of the Principe printer. Only through hindsight using the Applicant's disclosure as a guide can one reach the conclusion that Principe should be modified.

The Applicant respectfully notes that the Examiner is incorrect about Cleary teaching a vacuum source to apply a vacuum to the substrate to help maintain a distance between the substrate and a print head. The Examiner cites column 3, lines 50-55, however, those lines state that the vacuum is used to prevent the substrate from slipping on the transport belt. They do not indicate that the vacuum is used to maintain a distance between the substrate and a print head. In actuality, an indicator roller or laser triangulation device is used to detect changes in substrate thickness and the carriage height is adjusted to maintain a distance between the substrate and print head. *See* col. 5, lines 3-17 and col. 6, lines 10-16.

With respect to the Cleary reference (or '355 patent) the Applicant also notes that it is completely silent on the placement of UV lamps on a print head carriage or problems associated with curing UV ink. The '355 patent mentions "solvent pigment inks, UV resistant inks, or

water inks,” col. 6, line 7, none of which are UV curable inks.¹ Instead of relating to problems with UV curable inks, the '355 patent is directed to sensing the thickness of a substrate and adjusting the distance between a substrate and a print head. This is done so that the printer can handle different types of substrates which are likely to have different thicknesses. The adjustment in print head-to-substrate distance is based on a measurement made by thickness roller 20 at a point that is prior to the substrate reaching the print head (see Figs. 1 and 2A). There is no discussion whatsoever about a change in substrate thickness or change in the distance between the substrate and the print head that might occur due to thermal deformation.

Therefore, for all the reasons noted above, the combination of Principe, Jackson, and Cleary does not teach or suggest the claimed subject matter. Accordingly, claims 1, 9, 12, 27, 31, 34, 39, 48, and 50-51 should be allowed. The rejections of the remaining claims are all based on the combination of Principe, Jackson, and Cleary and one or more other references.

Claim 38 was rejected as being unpatentable over Nagasaka, Jackson, Cleary, and Anon. Claim 38 depends from allowable claim 31, and therefore is allowable. As noted above, claim 31 is allowable over Principe, Jackson, and Cleary. Claim 31 is also allowable over Nagasaka, Jackson, and Cleary for the same reasons set forth in our previous response. As a consequence, these rejections fail for the same reasons discussed.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case. Applicant also asks the Examiner to telephone the attorneys of record as soon as the Office has

¹ See, e.g., Scott Schinlever, *How to Capitalize on Flatbed UV Inkjet Technology* (November 11, 2006), at <http://www.screenweb.com/index.php/channel/2/id/3353> (“Do UV inks give my prints better resistance to sunlight and weather conditions? No, this is a misconception. The term ‘UV curable’ is sometimes confused with ‘UV resistant.’ Actually, both solvent-based[, UV resistant inks] and UV-curable inks provide excellent UV resistance and weatherability. In both cases, substrates generally deteriorate before the inks do.”).

reached a decision regarding whether to allow the claims or issue a final rejection. Applicant reserves the right to supplement this filing with additional arguments and evidence.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'D. Stettner', with a long horizontal line extending to the right.

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